



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,662	03/23/2004	Tadao Kikumoto	230980-0248	1164
23392 7590 04/15/2009 FOLEY & LARDNER 555 South Flower Street SUITE 3500 LOS ANGELES, CA 90071-2411			EXAMINER YEN, ERIC L.	
			ART UNIT 2626	PAPER NUMBER
			MAIL DATE 04/15/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/806,662

Applicant(s)

KIKUMOTO, TADAO

Examiner

ERIC YEN

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. In response to the Final Office Action mailed 11/19/08, applicant has submitted an amendment and Request for Continued Examination filed 2/17/09.

Claims 1, 37, and 38, have been amended. New Claims 47-48 have been added.

Response to Arguments

1. Applicant's arguments with respect to claims 1, 37, and 38, have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 37 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

claim 37 is rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent¹[1] and recent Federal Circuit decisions²[2] indicate that a statutory "process" under 35 U.S.C. 101 must (1) be

ted to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

The method steps consist of a series of calculations and analyses of signals that do not require a machine. Therefore, the method steps are not tied to a machine as required in In Re Bilski.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choi (US 2003/0014246), in view of Cano et al. ("Voice Morphing System for Impersonating in Karaoke Applications"), hereafter Cano, and Gibson et al. (US 6,336,092).

As per Claim 1, Choi teaches a vocoder system comprising: formant detection means for analyzing a first tone signal to detect formant characteristics of the first tone

signal ("voice signal of the subscriber... detect the spectrum parameter", paragraph 46; "spectrum parameter... are detected", paragraph 47; where the spectrum of a signal comprises, among other things, the formants of a voice)

tone signal input means for inputting a second tone signal that corresponds to specified pitch information ("selects the kind of the effect... converts the spectrum parameter... with reference to the loaded spectrum parameter...conversion of the spectrum parameter... height of voice", paragraph 47)

setting means for setting modulation levels based on the formant characteristics and formant control information with which the formant characteristics detected by the formant detection means are changed ("selects the kind of the effect... converts the spectrum parameter... with reference to the loaded spectrum parameter...conversion of the spectrum parameter... height of voice", paragraph 47; "modulating", paragraph 38)

modulation means for modulating a level of a signal based on the modulation level set in the setting means ("modulating", paragraph 38).

Choi fails to teach the tone signals are musical tone signals.

Cano teaches the tone signals are musical tone signals ("target singer", Introduction).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi to include the teaching of Cano of the tone signals are musical tone signals, in order to extend voice changing to singing applications, as described by Cano (Introduction).

Choi, in view of Cano, fail to teach division means for dividing the second musical tone signal into a plurality of frequency bands, the respective center frequencies of which have been fixed, where the modulation levels are set at the fixed center frequency of each of the frequency bands, and where modulating the level of a signal modulates levels of each of the frequency bands.

Gibson suggests division means for dividing the second musical tone signal into a plurality of frequency bands, the respective center frequencies of which have been fixed, where the modulation levels are set at the fixed center frequency of each of the frequency bands, and where modulating the level of a signal modulates levels of each of the frequency bands ("signal is split into two equal-width frequency bands... gain compensation... transformed ", col. 9, lines 44-65; "summing a gain-compensated high-frequency signal and the transformed low-frequency component", col. 9, line 65 – col. 10, line 2; "source and target voice signals", col. 7, lines 17-28; where, to determine the target voice characteristics and the necessary transformations, an analysis of the target voice signals in the corresponding frequency bands is obvious/necessary).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of division means for dividing the second musical tone signal into a plurality of frequency bands, the respective center frequencies of which have been fixed, where the modulation levels are set at the fixed center frequency of each of the frequency bands, and where modulating the level of a signal modulates levels of each of the frequency

bands, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

As per Claims 37-38, their limitations are similar to those in Claim 1, and so are rejected under similar rationale.

As per Claim 2, Choi fails to teach wherein the format detection means comprises a filter.

Gibson suggests wherein the format detection means comprises a filter ("signal is split into two equal-width frequency bands... gain compensation... transformed ", col. 9, lines 44-65; "summing a gain-compensated high-frequency signal and the transformed low-frequency component", col. 9, line 65 – col. 10, line 2; "source and target voice signals", col. 7, lines 17-28; where division into frequency bands involves filtering an input spectrum).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of wherein the format detection means comprises a filter, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

As per Claim 3, Choi teaches wherein the formant detection comprises a Fourier transform ("spectrum parameter... are detected", paragraph 47; where a spectrum is a

frequency domain representation obtained by applying a transform, which is commonly a Fourier transform).

As per Claims 4-6, Choi, in view of Cano, fail to teach wherein the division means comprises a filter.

Gibson suggests wherein the division means comprises a filter ("signal is split into two equal-width frequency bands... gain compensation... transformed ", col. 9, lines 44-65; "summing a gain-compensated high-frequency signal and the transformed low-frequency component", col. 9, line 65 – col. 10, line 2; "source and target voice signals", col. 7, lines 17-28; where division into frequency bands involves filtering an input spectrum).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of wherein the division means comprises a filter, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

As per Claims 7-9, Choi, in view of Cano, fail to teach wherein the division means comprises a Fourier transform.

Gibson suggests wherein the division means comprises a Fourier transform ("signal is split into two equal-width frequency bands... gain compensation... transformed", col. 9, lines 44-65; "summing a gain-compensated high-frequency signal and the transformed low-frequency component", col. 9, line 65 – col. 10, line 2; "source

and target voice signals", col. 7, lines 17-28; "spectral", col. 9, lines 32-43; where division into frequency bands involves filtering an input spectrum).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of wherein the division means comprises a Fourier transform, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

As per Claims 10-18, Choi fails to teach wherein the setting means sets the modulation levels by interpolation processing based on the formant characteristics and the formant control information.

Cano teaches wherein the setting means sets the modulation levels by interpolation processing based on the formant characteristics and the formant control information ("target singer", Introduction; "interpolated", Section 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi to include the teaching of Cano of wherein the setting means sets the modulation levels by interpolation processing based on the formant characteristics and the formant control information, in order to extend voice changing to singing applications, as described by Cano (Introduction).

As per Claim 19-23, Choi teaches wherein the setting means sets modulation levels based on pitch information, the formant characteristics, and the formant control

information ("pitch... pitch period", paragraph 35; "converting... the pitch period", paragraph 17).

As per Claims 24-27, Choi teaches wherein the setting means sets modulation levels based on musical interval, the formant characteristics, and the formant control information ("pitch... pitch period", paragraph 35; "converting... the pitch period", paragraph 17; where a "period" is an interval, and the pitch applies to musical characteristics).

As per Claim 28-36, Choi teaches wherein the setting means stores a formant change table that changes the formant non-uniformly and sets the modulation levels based on the change table ("selected effect", paragraph 19; "cave", paragraph 47; where the information for each of the effects must be arranged in memory to be found by the application, and this organized memory is a form of table).

Choi, in view of Cano, fail to teach where the modulation levels correspond to each of the frequency bands.

Gibson suggests where the modulation levels correspond to each of the frequency bands ("signal is split into two equal-width frequency bands... gain compensation... transformed", col. 9, lines 44-65; "summing a gain-compensated high-frequency signal and the transformed low-frequency component", col. 9, line 65 – col. 10, line 2; "source and target voice signals", col. 7, lines 17-28; "spectral", col. 9, lines 32-43; where division into frequency bands involves filtering an input spectrum).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of where the modulation levels correspond to each of the frequency bands, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

As per Claim 39, its limitations are similar to those in Claim 2, and so is rejected under similar rationale.

As per Claim 40, its limitations are similar to those in Claim 3, and so is rejected under similar rationale.

As per Claim 41, Choi teaches wherein the first musical tone signal is produced by a male voice or a female voice ("voice", paragraph 4; where voices by a human are either male or female).

As per Claim 42, Choi, in view of Cano, fail to teach wherein the level of the signal of each of the frequency bands modulated by the modulation means is an amplitude of the signal.

Gibson suggests division wherein the level of the signal of each of the frequency bands modulated by the modulation means is an amplitude of the signal ("signal is split

into two equal-width frequency bands... gain compensation... transformed ", col. 9, lines 44-65; "summing a gain-compensated high-frequency signal and the transformed low-frequency component", col. 9, line 65 – col. 10, line 2; "source and target voice signals", col. 7, lines 17-28; gains affect amplitudes of a spectrum).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of wherein the level of the signal of each of the frequency bands modulated by the modulation means is an amplitude of the signal, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

As per Claim 43, Choi, in view of Cano, fail to teach wherein, in the modulation means, the center frequencies of the frequency bands are maintained as fixed in the division means.

Gibson suggests wherein, in the modulation means, the center frequencies of the frequency bands are maintained as fixed in the division means ("signal is split into two equal-width frequency bands... gain compensation... transformed ", col. 9, lines 44-65; "summing a gain-compensated high-frequency signal and the transformed low-frequency component", col. 9, line 65 – col. 10, line 2; "source and target voice signals", col. 7, lines 17-28; the filters do not change the frequency range that they occupy, and so their center frequencies do not change either).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of

wherein, in the modulation means, the center frequencies of the frequency bands are maintained as fixed in the division means, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

As per Claims 44, Choi fails to teach wherein the setting means sets the modulation levels by using a polynomial interpolation.

Cano teaches wherein the setting means sets the modulation levels by using a polynomial interpolation ("target singer", Introduction; "interpolated", Section 2; where the use of polynomial interpolations are an obvious to one of ordinary skill in the art as a type of interpolation that can be used to convert voices).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi to include the teaching of Cano of wherein the setting means sets the modulation levels by using a polynomial interpolation, in order to extend voice changing to singing applications, as described by Cano (Introduction).

As per Claim 45, Choi, in view of Cano, fail to teach wherein the center frequencies of the modulated signals of the frequency bands are equal to the respective center frequencies of the frequency bands, as fixed by the division means.

Gibson suggests wherein the center frequencies of the modulated signals of the frequency bands are equal to the respective center frequencies of the frequency bands, as fixed by the division means ("signal is split into two equal-width frequency bands... gain compensation... transformed ", col. 9, lines 44-65; "summing a gain-compensated

high-frequency signal and the transformed low-frequency component”, col. 9, line 65 – col. 10, line 2; “source and target voice signals”, col. 7, lines 17-28; the filters do not change the frequency range that they occupy, and so their center frequencies do not change either).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of wherein the center frequencies of the modulated signals of the frequency bands are equal to the respective center frequencies of the frequency bands, as fixed by the division means, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

As per Claim 46, Choi teaches wherein the first musical tone signal is a speech signal (“voice”, paragraph 4).

As per Claim 47, Choi fails to teach wherein the setting means sets the modulation level by interpolation processing based on the formant characteristics at a plurality of frequencies.

Cano teaches wherein the setting means sets the modulation level by interpolation processing based on the formant characteristics at a plurality of frequencies (“target singer”, Introduction; “interpolated”, Section 2; where the use of polynomial interpolations are an obvious to one of ordinary skill in the art as a type of interpolation that can be used to convert voices).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi to include the teaching of Cano of wherein the setting means sets the modulation level by interpolation processing based on the formant characteristics at a plurality of frequencies, in order to extend voice changing to singing applications, as described by Cano (Introduction).

Choi, in view of Cano, fail to teach the modulation level is set at the fixed center frequency of at least one of the frequency bands.

Gibson suggests the modulation level is set at the fixed center frequency of at least one of the frequency bands ("signal is split into two equal-width frequency bands... gain compensation... transformed ", col. 9, lines 44-65; "summing a gain-compensated high-frequency signal and the transformed low-frequency component", col. 9, line 65 – col. 10, line 2; "source and target voice signals", col. 7, lines 17-28; the filters do not change the frequency range that they occupy, and so their center frequencies do not change either).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of the modulation level is set at the fixed center frequency of at least one of the frequency bands, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

As per Claims 48, Choi fails to teach wherein the setting means sets the modulation levels by using a polynomial interpolation of the formant characteristics at a plurality of frequencies.

Cano teaches wherein the setting means sets the modulation levels by using a polynomial interpolation of the formant characteristics at a plurality of frequencies ("target singer", Introduction; "interpolated", Section 2; where the use of polynomial interpolations are an obvious to one of ordinary skill in the art as a type of interpolation that can be used to convert voices).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi to include the teaching of Cano of wherein the setting means sets the modulation levels by using a polynomial interpolation, in order to extend voice changing to singing applications, as described by Cano (Introduction).

Choi, in view of Cano, fail to teach wherein the modulation levels are set at the fixed center frequency of at least one of the frequency bands.

Gibson suggests wherein the modulation levels are set at the fixed center frequency of at least one of the frequency bands ("signal is split into two equal-width frequency bands... gain compensation... transformed ", col. 9, lines 44-65; "summing a gain-compensated high-frequency signal and the transformed low-frequency component", col. 9, line 65 – col. 10, line 2; "source and target voice signals", col. 7, lines 17-28; the filters do not change the frequency range that they occupy, and so their center frequencies do not change either).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Choi, in view of Cano, to include the teaching of Gibson of wherein the modulation levels are set at the fixed center frequency of at least one of the frequency bands, in order to transform voices with reduced computational demands, as described by Gibson (col. 9, lines 62-65).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC YEN whose telephone number is (571)272-4249. The examiner can normally be reached on M-F 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on 571-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EY 4/10/09

/Richmond Dorvil/
Supervisory Patent Examiner, Art Unit 2626